

# COURSE SYLLABUS

## 1. Program information

1.1. Institution	Petroleum-Gas University of Ploiești
1.2. Faculty	Petroleum Refining and Petrochemistry
1.3. Department	Petroleum Processing and Environmental Engineering
1.4. Field of study	Chemical engineering
1.5. Study cycle	Full time
1.6. Study program	Chemical Engineering for Refineries and Petrochemical Industry

## 2. Course information

2.1. Course title	Process modeling, simulation and optimization		
2.2. Course coordinator	Assistant Prof. PhD. Eng. Fendu Elena Mirela		
2.3. Laboratory / seminar coordinator	Assistant Prof. PhD. Eng. Fendu Elena Mirela		
2.4. Project coordinator			
2.5. Year of study	1st		
2.6. Semester *	2nd		
2.7. Evaluation type	Exam		
2.8. Course type - formative category **	DD	2.9. Type of subject matter ***	C

\* the semester number is in accordance with the curriculum;

\*\* fundamental = DF; domain = DD; speciality = DS; complementary = DC; thoroughgoing = DA; synthesis = DSI.

\*\*\* compulsory = C; optional = O; elective = E

## 3. Total estimated time (teaching hours per semester)

3.1. Number of hours per week	5	of which: 3.2. course	2	3.3. Seminars/laboratories	3	3.4. Project	
3.5. Total hours from curriculum	70	of which: 3.5. course	28	3.6. Seminars/laboratories	42	3.7. Project	
3.8. Time distribution							hours
Study of textbook, course support, bibliography and notes							30
Further reading in the library, on online platforms and fieldwork							20
Preparing seminars / laboratories, homework, portfolios and essays							20
Tutoring							5
Examinations							5
Other activities							
3.7. Total hours of individual study	80						
3.8. Total hours per semester	150						
3.9. Number of credits	6						

## 4. Prerequisites (where applicable)

4.1. curriculum	➤ Computer Programming, Chemical Processes
4.2. skills	➤ Thermodynamic calculations

## 5. Requirements (where applicable)

5.1. course	➤ Projector, screen, computer
5.2. seminars/laboratory	➤ Computers with PRO/II Software process simulation program

## 6. Specific competences

<b>Professional competences</b>	<ul style="list-style-type: none"> <li>➤ Defines the process and design of technical components: the description, analysis and advanced use of fundamental concepts and theories in the field of chemical engineering.</li> <li>➤ Designs equipment and apparatus for utilities: the design of devices, processes and installations with the application of knowledge in the field of chemical engineering.</li> <li>➤ Analyses production processes in order to improve: real-time management of processes and installations in the chemical industry.</li> <li>➤ Develops design plans: Conceptual design of chemical processes.</li> <li>➤ Advanced knowledge of software programs specific to chemical engineering and the use of computers and the internet.</li> </ul>
<b>Cross-urricular competences</b>	<ul style="list-style-type: none"> <li>➤ Ensures project management planning, organizing and leading professional groups or institutions.</li> <li>➤ Ability to provide permanent information and documentation in his/her field of activity, but also in related fields, both in Romanian and in an internationally language.</li> <li>➤ Efficient and effective performance of individual professional activities, in conditions of autonomy and professional independence.</li> <li>➤ Ability to perform professional tasks as a team leader.</li> </ul>

## 7. Course objectives (based on the competence grid)

7.1. General objective	➤ Acquiring skills in the field of chemical process simulation and optimization
7.2. Specific objectives	<ul style="list-style-type: none"> <li>➤ The ability to perform calculations in the chemical process simulation</li> <li>➤ The ability to evaluate, explain and interpret processes that are optimized</li> </ul>

## 8. Contents

8.1. Course	Time	Teaching methods	Comments
Modeling and simulation of unit processes	15	Course material made available in the form of slides, books in PDF format - Interactive Teaching using Power Point, PRO / II Simulator Software - Questions and periodic tests	
Convergence	3		
Simulation of recycling processes	3		
Display the results and their interpretation	2		
Optimization methods	5		
Bibliography			
1. Seider. Seader, Lewin, Process Design Principles – John Wiley & Sons, Inc., 1999.			
2. Douglas, Conceptual Design of Process Engineering, McGraw Hill, 1988.			
3. Bohîlțea, Cursaru, D., Elemente de modelare și optimizare a proceselor chimice, MatrixRom, 2009.			
4. Process Simulation of Aveva Software, AVEVA Group LimitedHigh Cross Madingley Road Cambridge CB3 0HB, UK, 2024.			
8.2. Seminar / laboratory	Time	Teaching methods	Comments
Modeling and simulation of simple unit processes	6		

Modeling and simulation of complex unit processes	11	- Interactive Teaching using PRO / II Simulator Software and office package - Questions and periodic tests	
Convergence	5		
Simulation of recycling processes	5		
Display the results and their interpretation	5		
Chemical process optimization	10		
Bibliography			
1. Process Simulation of Aveva Software, AVEVA Group LimitedHigh Cross Madingley Road Cambridge CB3 0HB, UK, 2024.			
2. Bohîlțea, Cursaru, D., Elemente de modelare și optimizare a proceselor chimice, MatrixRom, 2009.			
8.3. Project	Time	Teaching methods	Comments
Bibliography			

### 9. Correlation of the course contents with the demands of the epistemic community representatives, professional associations and representative employers in the field of the program

- The course syllabus was developed in cooperation with representatives of engineering companies in Ploiești and Bucharest that have hired graduates of similar master programs

### 10. Evaluation

Activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Percentage of final grade
10.4. Course	Presence	Presence	10
	Quality and quantity of accumulated knowledge	Practical exam, computer applications	60
10.5. Seminar/laboratory	Quality and quantity of accumulated knowledge	Presence The accuracy of laboratory works The accuracy of homework's	30
10.6. Project			
10.7. Minimum performance standard			
Simulation and optimization of a chemical process.			

Signature  
date

05.02.2025

Date of approval in the  
department  
20.03.2025

Course coordinator



Seminar/laboratory coordinator



Project coordinator

Head of department  
Associate Prof. PhD. Eng.  
Neagu Mihaela



Dean  
Assistant Prof. PhD. Eng. Dușescu -Vasile  
Cristina Maria

